

What is claimed is

1. A method for monitoring the health of a system, which comprises performing at each of a plurality of times the
5 steps of:
constructing a condition signature from a plurality of condition indicators including (a) a plurality of vibration measurements acquired from said system or (b) one or more vibration measurements and one or more performance
10 parameter measurements acquired from said system;
predicting a normal signature from a model defining one or more inter-dependencies between said condition indicators, said normal signature corresponding to a condition signature for a healthy system;
15 comparing said condition signature with said normal signature; and
registering an event if said condition signature differs from said normal signature by more than a predetermined threshold.
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2. A method according to claim 1, wherein said model is a learnt model.
3. A method according to claim 1, wherein said model
25 comprises a matrix with one or more non-zero off-diagonal terms to define said interdependencies.
4. A method according to claim 3, wherein the step of
30 comparing said condition signature with said normal signature involves calculating a value for the normalised innovations squared.
5. A method according to claim 1, wherein said model comprises a neural network.

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6. A method according to claim 5, wherein the step of comparing said condition signature with said normal signature involves calculating a prediction error.

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7. A method according to claim 1, wherein said times define successive intervals of at most 1 sec duration.

8. A method for monitoring the health of a system, which comprises performing at each of a plurality of times defining successive intervals of at most 1 sec duration the steps of:

constructing a condition signature from a plurality of condition indicators including (a) a plurality of vibration measurements acquired from the system or (b) one or more vibration measurements and one or more performance parameter measurements acquired from said system;

predicting a normal signature corresponding to a condition signature for a healthy system;

comparing said condition signature with said normal signature; and

registering an event if said condition signature differs from said normal signature by more than a predetermined threshold.

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9. A method according to claim 8, wherein said normal signature is predicted from a model defining one or more inter-dependencies between said condition indicators

10. A method according to claim 9, wherein said model is a learnt model.

11. A method according to claim 9, wherein said model comprises a matrix with one or more non-zero off-diagonal

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processor means for constructing a condition signature from said condition indicators and for predicting a normal signature corresponding to a condition signature for a healthy system, said normal signature being predicted by a

model which defines one or more inter-dependencies between said condition indicators;

comparator means for comparing said condition signature with said normal signature; and

5 registration means for registering an event if said comparator indicates that said condition signature differs from said normal signature by more than a predetermined threshold.

10 18. A data processing system for monitoring the health of a system, comprising:

data acquisition means for acquiring a plurality of condition indicators from said system at each of a plurality of times defining successive intervals of at most
15 1 sec duration, said condition indicators including (a) a plurality of vibration measurements or (b) one or more vibration measurements and one or more performance parameter measurements;

processor means for constructing a condition signature
20 from said condition indicators and for predicting a normal signature corresponding to a condition signature for a healthy system;

comparator means for comparing said condition signature with said normal signature; and

25 registration means for registering an event if said comparator indicates that said condition signature differs from said normal signature by more than a predetermined threshold.

30 19. A method of synchronising two or more data streams, each data stream comprising a series of sequentially acquired data elements, the method comprising:

associating a time stamp with each data element of each stream, the time stamp identifying the time of

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5 conducting a search of the data elements of the or
each other stream to identify the data element in the or
each other element having an associated time stamp closest
to that of the selected element of the first stream; and
 marking said identified data element of the or each
10 other stream and said selected element of the first stream
as being synchronised with one another.

21. A data processing system for synchronising two or more data streams, each data stream comprising a series of sequentially acquired data elements, comprising;

means for selecting a first data element from a first
25 stream and inspecting its time stamp;

30 stream; and

means for marking said identified data element of the or each other stream and said selected element of the first stream as being synchronised with one another.